IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

Applicants	:	Vasudevan Parthasarathy et al.
Application No.:		09/391,059
Filed	:	September 7, 1999
For	:	CODE MAPPING IN A TRELLIS DECODER
Examiner	:	Edith M. Chang
Art Unit	:	2637

APPEAL BRIEF

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May It Please The Honorable Board:

Appellants appeal from the FINAL Office Action dated September 19, 2005, and the Advisory Action dated January 6, 2006, in which claims 1-3, 5-8, 12, 13, 18 and 19 of the above-identified application stand rejected and claims 4, 9-11 and 14-16 of the above-identified application stand objected to.

Appellants waive an Oral Hearing for this appeal.

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Signature Lori Klewin Date: March 29, 2006
Lori Klewin

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I. REAL PARTY IN INTEREST

The real party in interest of Application No. 09/391,059 is:

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France.

II. RELATED APPEALS AND INTERFERENCES

There are no related Appeals or Interferences.

III. STATUS OF THE CLAIMS

Claims 1-16 and 18-19 are pending in this application. Claim 17 has been canceled.

Claim 1-3, 5-8, 12, 13, 18 and 19 have been rejected.

Claims 4, 9-11 and 14-16 have been objected to.

The rejection of claims 1-3, 5-8, 12, 13, 18 and 19 are appealed.

IV. STATUS OF AMENDMENTS

A response to the FINAL Office Action dated September 19, 2005, was filed by Appellants' representative on December 9, 2005 seeking reconsideration. This response included proposed amendments to claims 4, 10 and 11.

An Advisory Action dated January 6, 2006 maintained the FINAL rejection and entered the proposed amendments for the purposes of appeal.

In response to the Advisory Action, Appellants' representative filed a Notice of Appeal on February 14, 2006.

This appeal is directed to the claims as they stood at the time of the Advisory action of January 6, 2006, which are shown in the Claims Appendix of this Brief.

V. SUMMARY OF CLAIMED SUBJECT MATTER

There are four independent claims in the application: 1, 5, 13 and 18.

All of Appellants' independent claims are directed to a method or apparatus for demapping received encoded symbol data to provide decoded symbol data.

In this regard, claim 1 is directed to a method that requires at least four types of data. The first type of data is "**delayed data**," which represents received encoded symbols that are delayed in time. (Claim 1, ln. 3; Appellants' specification, p. 6, ln. 20). The second type of data are **re-encoded symbols**. The latter are derived by decoding received encoded symbols to produce decoded symbols, which are then re-encoded. (Claim 1, ln. 4; Appellants' specification, p. 6, lns. 17-19.) The third type of data is "**difference data**," which is produced by the feed-forward processing of re-encoded symbols. (Claim 1, lns. 4-8; Appellants' specification, p. 4, lns. 5-7; p. 21, lns. 10-17; p. 21, ln. 40 to p. 22, ln. 3, FIG. 11.) The "difference data" represents a "difference between successive symbols of said re-encoded symbol data." (Claim 1, lns. 7-8; Appellants' specification, p. 21, lns. 17-19; signals between elements 960 and 965 of FIG. 11.) Finally, **decoded symbols** are derived by using the "delayed data and the "difference data." (Claim 1, lns. 9-10; Appellants' specification, p. 21, lns. 19-28, FIG. 11.)

Appellants remaining independent claims 5, 13 and 18 are directed to various apparatus having similar requirements to those found in method claim 1.

In particular, independent apparatus claim 5 is an apparatus form of method claim 1. Claim 5 requires a delay element (70 of FIG. 1) for producing "delayed data," a re-encoder (50 of FIG. 1) for producing re-encoded symbol data; and a processor (60 of FIG. 1) for performing the above-described feed-forward processing on "difference data" and for deriving the decoded symbol data using the "difference data" and the "delayed data."

In like fashion, independent apparatus claim 13 requires a delay element (70 of FIG. 1) for producing "delayed data," a re-encoder (50 of FIG. 1) for producing re-encoded symbol data; and a processor (60 of FIG. 1) that includes a feed-forward processor (element 960 of Fig. 11) and a decision processor (elements 965, 971, 973, 963, 977, 964, 975 and 980 of FIG. 11). The feed-forward processor performs the above-described "feed-forward processing;" and the decision processor derives the decoded symbol data using the "delayed data" and the "difference data."

Finally, independent apparatus claim 18 specifies a trellis decoding apparatus similar in form to the above-described independent claim 13.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The Examiner has rejected claims 1-3, 5-8, 12-13 and 18-19 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 5,914,988 issued June 22, 1999 to Hu et al. ("*Hu*").

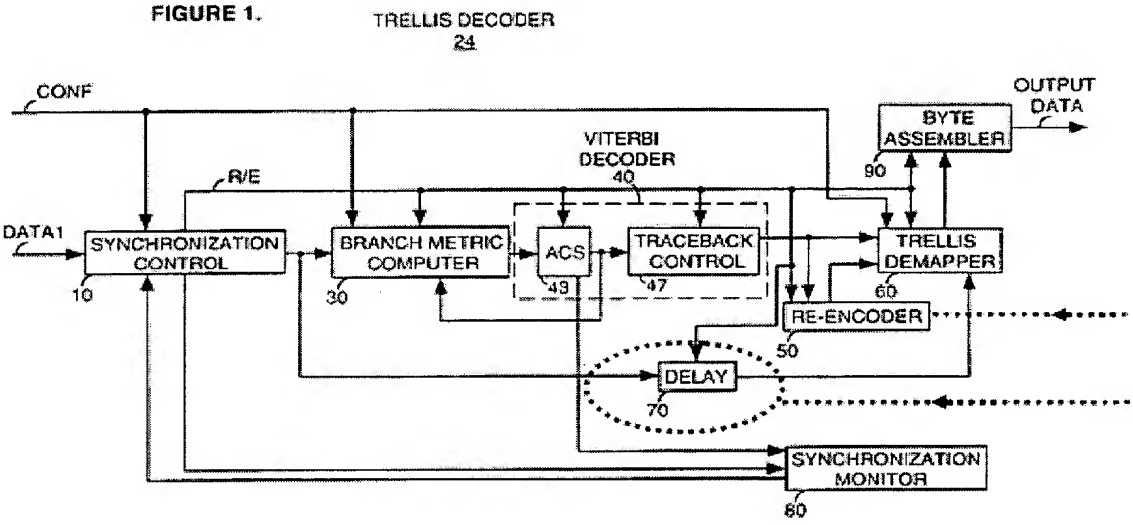
VII. ARGUMENT

Rejection of Claims 1-3, 5-8, 12-13 and 18-19 under 35 U.S.C. § 102(e) as being anticipated by *Hu*

BACKGROUND

Before addressing the Examiner's points, some background information is provided with respect to *Hu*. Although the technology described in *Hu* is somewhat complex, a couple of simple points can be observed from FIGs. 1 and 11 of *Hu*. In this regard, attention should first be directed to an annotated version of FIG. 1 of *Hu*, which is shown below.

FIGURE 1.



This figure of *Hu* provides an overview of the signal processing. Attention should be first directed to those portions of FIG. 1 indicated by the dotted-line circles and arrows toward the right of this figure that point out delay unit 70 and re-encoder 50. It should be observed from FIG. 1 of *Hu* that delay unit 70 processes a signal from synchronization control unit 10. In particular, delay unit 70 delays received encoded symbol data to provide "delayed data" to trellis demapper 60. (*Hu*, col. 3, lns. 31-33, 41-45; col. 4, lns. 27-30.)

Re-encoder 50 of *Hu* **re-encodes decoded data** provided by element 40 of FIG. 1. As stated in *Hu*:

> [u]nit 50 re-encodes the sequence of bits from unit 47 to provide a re-encoded bit sequence to demapper 60.
>
> *Hu*, col. 4, lns. 26-27; emphasis added.

This re-encoded bit sequence from re-encoder 50 is referred to herein as the "re-encoded symbol data." It should also be observed from FIG. 1 of *Hu* that re-encoder 50 does not process any signals from delay unit 70.[1] Thus, none of the delayed data is re-encoded by re-encoder 50 in *Hu*.

Attention should now be directed to an annotated version of FIG. 11 of *Hu*, which is shown below.

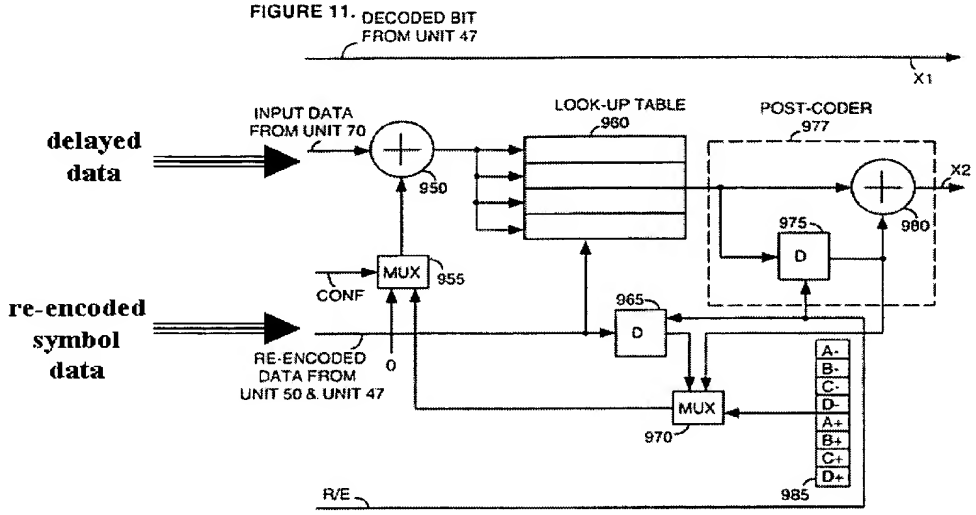


FIG. 11 of *Hu* shows in detail trellis demapper 60 shown in FIG. 1 of *Hu*. (*Hu*, col. 2, lns. 58-60.) The annotations added to FIG. 11 of *Hu* are the boldened terms "delayed data" and "re-encoded symbol data" as well as the multi-lined arrows on the left of the figure. First, it should be noted that adder 950 receives input data from unit 70. Since unit 70, as shown in FIG. 1, is delay unit 70, "delayed data" is provided to adder 950. In particular, *Hu* states:

> [i]n non-filtered data mode as selected by the CONF signal, input delayed symbol data of a first interleaved symbol from unit 70 is passed unaltered by adder 950 of the demapper unit of FIG. 11.
>
> *Hu*, col. 13, lns. 53-54; emphasis added.

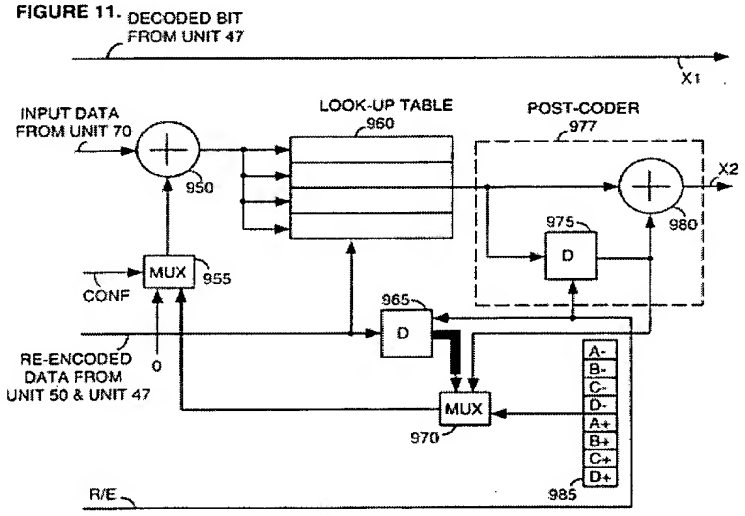
Second, it should be noted that the re-encoded symbol data (from re-encoder 50 of FIG. 1) is not applied to adder 950 of FIG. 11. Indeed, the re-encoded symbol data of *Hu* is only applied to elements 960 and 965.

[1] While col. 13, ln. 57, of *Hu* makes reference to re-encoded data "from units 50 and 70", this reference to unit 70 is clearly in error in light of FIG. 1 of *Hu*.

Third, it should be noted that trellis demapper 60 of FIG. 11 of *Hu* has two modes of operation - a "non-filtered data mode" and a "filtered data mode." The particular mode of operation is controlled by the CONF signal applied to MUX 955 of FIG. 11 of *Hu*. The CONF signal indicates whether or not the received signal is filtered by an NTSC co-channel interference rejection filter. (*Hu*, col. 3, lns. 53-57.)

In the "non-filtered data mode," delayed data simply passes through adder 950 unaltered because MUX 955 (as controlled by the CONF signal) simply provides a zero value. (*Hu*, col. 13, lns. 52-55.) However, in "filtered data mode," MUX 955 (as controlled by the CONF signal) causes the "delayed data" to be summed (via adder 950) with one of a number of **predetermined values** from unit 985, via MUX 970. (*Hu*, col. 14, lns. 11-15.)

In this "filtered data mode," a further point should be noted about *Hu*. This is highlighted in yet another annotation of FIG. 11 of *Hu*, shown below.



The annotation in this figure is a boldened line indicating the output signal from element 965 of *Hu*. As noted above, in "filtered data mode," the CONF signal controls multiplexer (MUX) 955 to select the signal from MUX 970 for application to adder 950. MUX 970 provides one of eight constellation points from unit 985. (*Hu*, col. 14, lns. 10-15.) **NONE** of these are the re-encoded symbol data. Indeed, the stored re-encoded symbol data provided by element 965 (represented by the above-noted boldened line) is a control signal for MUX 970 for use in selecting a particular one of the eight predetermined constellation points from element 985. (*Hu*, col. 14, lns. 22-28.)

INDEPENDENT CLAIMS 1, 5, 13 and 18 ARE NOT ANTICIPATED BY *HU*

DEPENDENT CLAIMS 3, 7, 8, 12 and 19 ARE NOT ANTICIPATED BY *HU*

Turning now to the rejection, the Examiner 's rejection of independent claims 1, 5, 13 and 18 as anticipated by *Hu* is wrong for any one of a number of reasons. Appellants will discuss claim 1, below. Claims 5, 13 and 18 have similar requirements and stand or fall with claim 1. Similarly, dependent claims 3, 7, 8, 12 and 19 stand or fall with their respective independent claims.

At the outset, it should be noted that this is Appellants' second attempt at the appeal process. Appellants' filed a first appeal brief on November 22, 2004, after which the Examiner re-opened prosecution.

In this regard, initially Appellants' will focus on the Examiner's arguments as presented in the most recent FINAL Office Action dated September 19, 2005 and as presented in the Advisory Action dated January 6, 2006. All of these arguments by the Examiner are flawed.

Appellants' claim 1 requires in part:

> (1) feed-forward processing said re-encoded symbol data to produce **difference data**; and
>
> (2) where the **difference data** is representative of a difference **between successive symbols of re-encoded symbol data**.
>
> Claim 1, lns. 6-8; emphasis added.

The Examiner states that these requirements are described and shown in *Hu*. However, the Examiner mischaracterizes *Hu* in a number of ways.

First, the Examiner states:

> [t]he reference Hu discloses in FIGURE 11 comparing the re-encoded data at current time n (symbol Sn) at the output of 965 to one input of 960.
>
> FINAL Office Action, p. 4; emphasis added.

Mere reference to FIG. 11 of *Hu* and its supporting disclosure shows that the Examiner is wrong. As noted above, in FIG. 11 of *Hu* the output of 965 is simply *one of two* control signals for multiplexer 970. (*Hu*, col. 14, lns. 22-28.) These control signals determine which one of the eight predetermined constellation points from element 985 is provided to element 950 in the above-noted "filtered data mode." (*Hu*, col. 14, lns. 22-28.) As such,

while a re-encoded symbol is stored in element 965, this stored re-encoded symbol is not provided to 960 (nor is it provided to 950 for that matter). Thus, *Hu* does not disclose "comparing the re-encoded data" as asserted by the Examiner and, therefore, *Hu* does not describe producing difference data as claimed by Appellants.

Second, the Examiner states that the output of element 950 of FIG. 11 of *Hu* provides:

> delayed re-encoded data at time n-1 (symbol Sn-1).
>
> FINAL Office Action, p. 4; emphasis added.

However, as noted above, the output of 950 of *Hu* is not re-encoded data. In particular, neither of the input signals to 950 come from re-encoder 50 of Figure 1 of *Hu*. (See Figure 1 of *Hu*.)

In fact, reference to an annotated version of FIG. 11 of *Hu* further illustrates the Examiner's incorrect analysis.

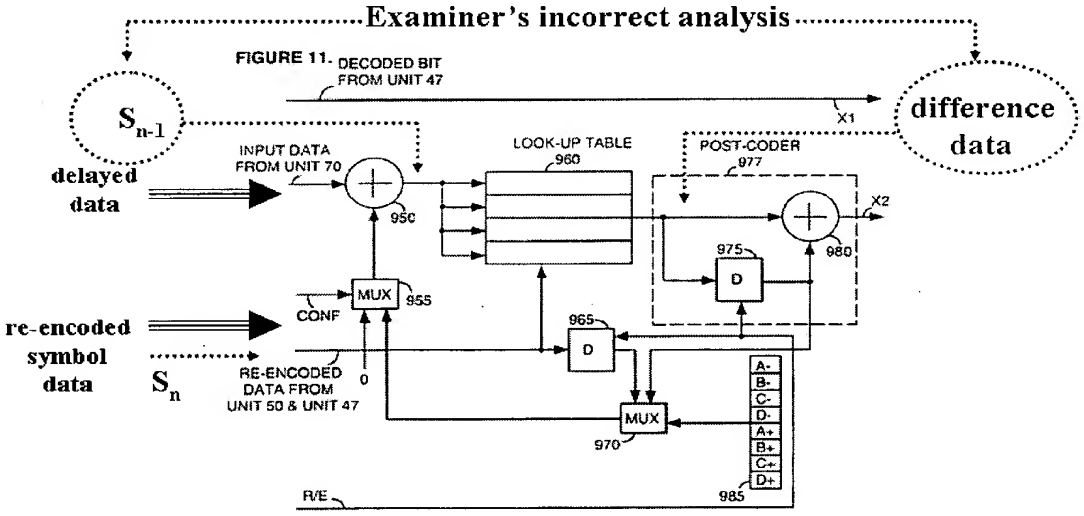


FIG. 11 of *Hu* above shows that the output of adder 950 is not a re-encoded symbol since FIG. 11 clearly shows that re-encoded symbols are not applied to adder 950. Therefore, the Examiner's assertion that the output of adder 950 is a re-encoded symbol, S_{n-1}, is without support in *Hu*.

In fact, it should be noted that in the "non-filtered data mode," adder 950 of *Hu* does not alter the delayed data. (*Hu*, col. 13, lns. 52-56.) Thus, in this mode adder 950 clearly does not produce re-encoded symbol data. And, in the "filtered data mode," the delayed data

is merely added to one of a number of predetermined values provided by element 985 of FIG. 11 of *Hu* (*Hu*, col. 14, lns. 10-15.) Indeed, *Hu* states:

> [i]n the filtered data mode, modified and delayed symbol packet data for the first interleaved symbol from unit 70 (FIG. 1) is summed by adder 950 of FIG. 11 with one of the eight constellation point (symbol) values from unit 985 via muxes 955 and 970.
>
> *Hu*, col. 14, lns. 15, emphasis added.

This addition of one of a number of fixed values does not produce re-encoded symbol data. Nor would one skilled in the art interpret this addition operation of adder 950 as re-encoding symbol data. Further, the mere selection of one of the number of predetermined values by a stored re-encoded symbol data via element 965 does not re-encode symbol data as required by Appellants' claim.

In this regard, Appellants' note that in the Office Action of December 12, 2003, the Examiner made reference to the output of element 955 of FIG. 11 as a source of re-encoded data, i.e., that the

> output [of element] 955 which supplies another re-encoded data that one unit delayed from the first one (965-970-955 FIGURE 11 of Hu).
>
> Office Action dated 12/12/03, p. 2.

As noted earlier, this is incorrect. Again, reference to FIG. 1 of *Hu* clearly shows that re-encoded symbol data is only provided by re-encoder 50 — not element 955 as asserted by the Examiner. Indeed, reference to FIG. 11 of *Hu* also clearly shows that re-encoded data is not supplied to the output of element 955 since re-encoded symbol data is not applied to the input signals of element 955. Again, in "non-filtered data mode," the output of element 955 is simply the value of zero; and in "filtered data mode," the output of element 955 is simply one of a number of predetermined values, i.e., constellation points, provided by element 985. (*Hu*, col. 13, lns. 53-56; col. 14, lns. 10-15.) Appellants do not understand how a predetermined value is now re-encoded symbol data as asserted by the Examiner.

Thus, the output from adder 950 is not re-encoded symbol data in any mode. In view of the above, the Examiner's position that the output of adder 950 represents a re-encoded symbol is without support in *Hu*. Thus, again, *Hu* does not describe producing difference data as claimed by Appellants.

In addition, the Examiner makes another mischaracterization of *Hu*. In particular, the Examiner states that the apparatus shown in FIG. 11 of *Hu* produces:

> difference data representative to post-coder 977 (column 13, lines 57-67) ...
>
> so that Z2 is determined by the minimum distance/difference (the closest) between the input symbol output from adder 950 (Sn-1), the received delay symbol point (Sn-1), and the Z0, Z1 of the Sn. Hence the output of the 960 to the input 977 is difference data representative of a difference (closet [sic], the minimum distance) between successive symbols (n current and n-1 delayed) of the re-encoded data.
>
> FINAL Office Action, p. 4; emphasis added.

However, the Examiner's above-underlined conclusion is wrong. The fact is that *Hu* explicitly states what is provided to post coder 977, i.e., *Hu* states:

> [t]he Z2 value of this constellation point is provided to post coder 977 as the decoded Z2 value for the first interleaved symbol.
>
> *Hu*, col. 13, lns. 64-67; emphasis added.

This is not **difference data representative of a difference between successive symbols of said re-encoded symbol data** as claimed by Appellants.

It should be noted that in the Advisory Action of January 6, 2006, the Examiner presents another argument involving element 975 of FIG. 11 of *Hu* — but this also fails. In particular the Examiner states that *Hu* discloses:

> a re-encoder (50) for re-encoding the received decoded data (output 40) to produce re-encoded symbol data ...
>
> a Trellis Demapper 60 ... [for] processing the re-encoded symbol data from 50 ...
>
> to produce "difference data representative (X2) of a difference between successive symbols of the re-encoded symbol data: one of the successive symbols from RE-ENCODED DATA and one of the successive symbols from Delay ... 975 of the RE-ENCODED DATA.
>
> Advisory Action, p. 2; emphasis added.

However, and as can be observed from FIG. 11 of *Hu*, the re-encoded symbol data provide by re-encoder 50 of *Hu* is not applied to element 975. In fact, the re-encoded symbol data provided by re-encoder 50 of *Hu* is only applied to elements 960 and 965 of

FIG. 11 of *Hu*. Thus it is not possible for element 975 of FIG. 11 of *Hu* to provide re-encoded symbol data as claimed by Appellants.

In addition, neither of the elements 960 and 965 of FIG. 11 of *Hu* provide Appellants' claimed difference data.

With regard to element 965 of FIG. 11 of *Hu*, this element has already been discussed above in the context of controlling selection of one of a number of predetermined values from element 985. This is not Appellants' claimed difference data.

With regard to element 960 of FIG. 11 of *Hu*, this element also does not provide difference data representative of a difference between successive symbols of said re-encoded symbol data as required by Appellants' claim. As shown in FIG. 11 of *Hu*, in "non-filtered data mode," look-up table 960 receives delayed data (via adder 950) and the current re-encoded symbol. As such, it is not possible for look-up table 960 to provide difference data between successive symbols of said re-encoded symbol data as required by Appellants' claim. Indeed, even in "filtered data mode," the apparatus of FIG. 11 of *Hu* provides one of a predetermined number of values to adder 950 (from element 985) — again, these are not re-encoded symbols. Again, even in "filtered data mode", it is not possible for look-up table 960 to provide difference data between successive symbols of said re-encoded symbol data as required by Appellants' claim.

Appellants note that the Examiner also points to col. 13, lns. 57-65 of *Hu* for support that element 960 provides difference data. However, this portion of *Hu* states:

> [i]nput re-encoded data Z1 and Z0 from units 50 and 70 for the first interleaved symbol uniquely define one of the four cosets previously described, as indicated in symbol mapper table 125 of FIG. 2. For example, Z1=1, Z0=0, defines coset point C (-3, +5). Look-up table function 960 of FIG. 11 compares the input symbol output from adder 950 with each of the two constellation points in the coset defined by inputs Z1 and Z0. **The constellation point closest to the received delayed symbol point is determined and** the Z2 value of this constellation point **is provided** to post-coder 977 as the decoded Z2 value for the first interleaved symbol. Post-coder 977 uses adder 980 and register 975 to provide the inverse function of pre-coder 102 of FIG. 2, and to decode the Z2 value to give an X2 bit for the first interleaved symbol. Demapper 60 repeats this process for each interleaved symbol packet received from unit 70 using synchronized associated symbol data from units 47 and 50. In this manner a sequence of X2 bits for the interleaved symbols from unit 70 (FIG. 1) corresponding to the interleaved symbols input to decoder 24 are sequentially output from adder 980.

Hu, col. 13, ln. 57 to col. 14, ln. 10, emphasis added.

As can be observed, nowhere does the above text from *Hu* describe Appellants' claimed

> difference data representative of a difference **between successive symbols** of said re-encoded symbol data.
>
> Claim 1, lns. 7-8, emphasis added.

Finally, Appellants' claim 1 also requires:

> deriving decoded symbol data using said delayed data and said difference data.
>
> Claim 1, lns. 9-10.

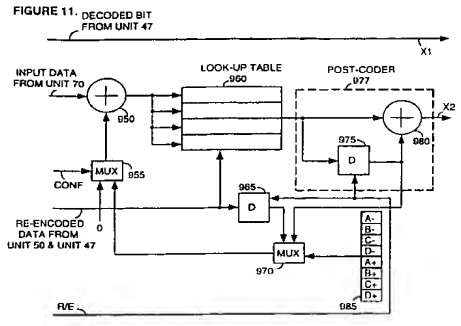
For any one of the reasons described above, it is not possible for *Hu* to describe "deriving decoded symbol data using said delayed data and said difference data" as claimed by Appellants.

In view of the above, Appellants independent claims 1, 5, 13 and 18 are not anticipated by *Hu*. Consequently, all of Appellants dependent claims are also not anticipated by *Hu*.

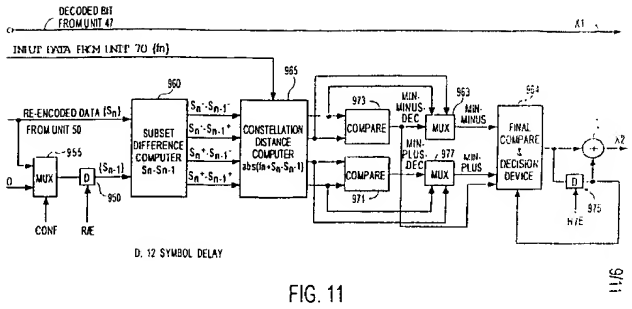
Finally, it should be noted that the Examiner states:

> [w]hile features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function.
>
> A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim" (MPEP 2114[R-1]).
>
> Advisory Action, January 6, 2006, emphasis added.

Appellants have assumed that the Examiner is asserting that trellis decoder 60 of FIG. 1 of *Hu* is identical to trellis decoder 60 of FIG. 1 of Appellants' application. However, a mere comparison between FIG. 11 of *Hu* (*Hu*, col. 1, lns. 58-60) and FIG. 11 of Appellants' application (Appellants' application, p. 4, lns. 5-7) shows that trellis decoder 60 of FIG. 1 of *Hu* is different from trellis decoder 60 of FIG. 1 of Appellants' application. This comparison is shown below.



Trellis decoder 60, FIG. 11 of Hu



Trellis decoder 60, Appellants' FIG. 11

Thus, the trellis decoder 60 of FIG. 1 of *Hu* is different from trellis decoder 60 of FIG. 1 of Appellants' application. Indeed, it can be clearly observed from FIG. 11 of Appellants' application that there is illustrative structural support for Appellants' claimed requirement of producing difference data as provided by illustrative element 960 of FIG. 11 of Appellants' application.[2] As noted above, there is no such element in FIG. 11 of *Hu* as required by Appellants' claim.

DEPENDENT CLAIMS 2 and 6 ARE NOT ANTICIPATED BY *HU*

Although Appellants' claim 1 requires "feed-forward processing," Appellants' acknowledge the Examiner's statement in the FINAL Office Action dated July 21, 2004 that claim 1 does not particularly exclude "feed-back processing." However, Appellants dependent claims 2 and 6 do require that the feed-forward processing be "exclusive of feed-back processing."

In this regard, and as noted above, in "filtered data mode," the apparatus of *Hu* shown in FIG. 11 uses feed-back processing. In particular, the selection of a constellation point from element 985 is controlled by both a re-encoded symbol (via unit 965) and the output signal from look-up table 960 (via unit 975). As such, dependent claims 2 and 6 are not anticipated by *Hu* in the "filtered data mode."

With respect to the "non-filtered data mode," the apparatus of *Hu* is configured to not use feed-back processing. However, and as noted above, in this case, adder 950 of FIG. 11 of *Hu* provides delayed data in an unaltered form to look-up table 960. Thus, for the reasons

[2] In fact, the Examiner continues to insist that Appellants re-label FIG. 1 of Appellants' application as Prior Art in view of FIG. 1 of *Hu*. However, this comparison of trellis decoders shows that the Examiner is wrong. Trellis decoder 60 of FIG. 1 of Appellants' application is different from trellis decoder 60 of FIG. 1 of *Hu*.

described above with respect to Appellants' claim 1, claim 2 is also not anticipated by *Hu* in "non-filtered data mode."

In view of the above, claims 2 and 6 are not anticipated by *Hu* in any mode operation.

DEPENDENT CLAIMS 4, 9, 10, 11, 14, 15 and 16 ARE NOT ANTICIPATED BY *HU*

The Examiner has objected to these claims as being dependent on a rejected base claim. As such, these claims are not anticipated by *Hu*.

VIII. CONCLUSION

For the above reasons, it is clear that *Hu* does not anticipate or make obvious appellants' claims 1-3, 5-8, 12-13 and 18-19. It is therefore respectfully requested that the rejection of claims 1-3, 5-8, 12-13 and 18-19 under 35 U.S.C. § 102(e) be reversed.

Respectfully submitted,

Vasudevan Parthasarathy et al.

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March 29, 2006

IX. CLAIMS APPENDIX

1. (Previously presented) A method for use in a decoder, the method comprising the steps of:

delaying received encoded symbol data to produce delayed data;

re-encoding decoded symbol representative data to produce re-encoded symbol data;

feed-forward processing said re-encoded symbol data to produce difference data representative of a difference between successive symbols of said re-encoded symbol data; and

deriving decoded symbol data using said delayed data and said difference data.

2. (Original) A method according to claim 1, wherein

said feed-forward processing is exclusive of feed-back processing.

3. (Original) A method according to claim 1, wherein

said feed-forward processing prevents error accumulation induced by error-propagation resulting from feed-back processing.

4. (Previously presented) A method according to claim 1, including the steps of

comparing candidate values, each candidate value representative of distance between said delayed data and said difference data, to determine a minimum distance value, and

if more than one candidate value has the same determined minimum distance value, resolving this equality in response to a prior delayed and fed back comparison representative output.

(claims continued on the next page)

5. (Previously presented) A decoder comprising:

a delay element for delaying received encoded symbol data to produce delayed data;

a re-encoder for re-encoding decoded symbol representative data to produce re-encoded symbol data; and

a processor for,

feed-forward processing said re-encoded symbol data to produce difference data representative of a difference between successive symbols of said re-encoded symbol data; and

deriving decoded symbol data using said delayed data and said difference data.

6. (Original) A decoder according to claim 5, wherein

said feed-forward processing is exclusive of feed-back processing.

7. (Original) A decoder according to claim 5, wherein

said feed-forward processing prevents error accumulation induced by error-propagation resulting from feed-back processing.

8. (Previously presented) A decoder according to claim 5, wherein

said processor includes a decision processor for deriving said decoded symbol data by computing an absolute distance between said difference data and a corresponding delayed received encoded symbol of said delayed data.

9. (Previously presented) A decoder according to claim 5, wherein said processor includes,

a decision processor for deriving said decoded symbol data by computing absolute distances using said difference data and said delayed data, and

a comparator for comparing the computed absolute distances to determine a minimum symbol difference value.

(claims continued on the next page)

10. (Previously presented) A decoder according to claim 5, wherein said processor includes,

a decision processor for comparing candidate values, each candidate value representative of distance between said delayed data and said difference data, to determine a minimum distance value and, if more than one candidate value has the same determined minimum distance value, resolving this equality in response to a prior delayed and fed back comparison representative output.

11. (Previously presented) A decoder according to claim 10, wherein

said prior delayed and fed back comparison representative output is only used in the case of equality.

12. (Original) A decoder according to claim 5, wherein

said processor derives decoded symbol data in a partial response system.

13. (Previously presented) A decoder comprising:

a delay element for delaying received encoded symbol data to produce delayed data;

a re-encoder for re-encoding decoded symbol representative data to produce re-encoded symbol data; and

a processor for demapping including,

a feed-forward processor for processing said re-encoded symbol data exclusively of feed-back processing in order to produce difference data representative of a difference between successive symbols of said re-encoded symbol data; and

a decision processor for deriving said decoded symbol data by computing an absolute distance using said difference data and said delayed data.

14. (Previously presented) A decoder according to claim 13, wherein said processor for demapping includes,

a comparator for comparing computed absolute distances to determine a minimum symbol difference value.

(claims continued on the next page)

15. (Previously presented) A decoder according to claim 13, wherein said processor for demapping includes,

a comparator for comparing candidate values representative of distance between said delayed data and said difference data to determine a minimum distance value and, if more than one candidate value has the same determined minimum distance value, resolving this equality in response to a prior delayed and fed back comparison representative output.

16. (Previously presented) A decoder according to claim 15, wherein said processor for demapping uses a different configuration in resolving equality than is used for deriving said difference data.

Claim 17 (Canceled).

18. (Previously presented) A trellis decoding apparatus comprising:

a delay element for delaying received trellis encoded data to produce delayed data;

a re-encoder for re-encoding decoded trellis encoded data using decision data associated with trellis state transitions in response to said trellis encoded data to produce re-encoded subset data;

a processor for,

feed-forward processing said re-encoded subset data to produce subset difference data representative of a difference between successive symbols using past subset outputs in an error propagation-free, feed-forward configuration; and

deriving decoded symbol data using said delayed data and said difference data.

19. (Previously presented) A trellis decoding apparatus according to claim 18, wherein

said error propagation-free feed-forward configuration of said processor derives decoded symbol data using past subset outputs instead of decoded bits themselves.

X. EVIDENCE APPENDIX (NONE)

None.

XI. RELATED PROCEEDINGS APPENDIX (NONE)

None.

PTO/SB/17 (01/06)
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Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL for FY 2006

MAR 3 1 2006

PATENT & TRADEMARK OFFICE

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 500.00

Complete if Known	
Application Number	09/391,059
Filing Date	September 7, 1999
First Named Inventor	Vasudevan Parthasarathy et al.
Examiner Name	Edith M. Chang
Art Unit	2637
Attorney Docket No.	RCA 88495

METHOD OF PAYMENT *(check all that apply)* **CUSTOMER NUMBER: 24498**

☐ Check ☐ Credit card ☐ Money Order ☐ None ☐ Other (please identify): _____

☒ Deposit Account: Deposit Account Number 07-0832 Deposit Account Name: THOMSON LICENSING INC.

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

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FEE CALCULATION (All the fees below are due upon filing or may be subject to a surcharge.)

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES	Small Entity	SEARCH FEES	Small Entity	EXAMINATION FEES	Small Entity	
Application Type	**Fee ($)**	**Fee ($)**	**Fee ($)**	**Fee ($)**	**Fee ($)**	**Fee ($)**	**Fees Paid ($)**
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	**Fee ($)**	**Small Entity Fee ($)**
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims		**Extra Claims**	**Fee ($)**	**Fee Paid ($)**
_____	- 20 or HP =	_____	x _____	= _____

HP = highest number of total claims paid for, if greater than 20.

Independent Claims		**Extra Claims**	**Fee ($)**	**Fee Paid ($)**
_____	- 3 or HP =	_____	x _____	= _____

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims	
Fee ($)	**Fee Paid ($)**
_____	_____

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets		**Extra Sheets**		**Number of each additional 50 or fraction thereof**	**Fee ($)**	**Fee Paid ($)**
_____	- 100 =	_____	/ 50 =	_____ (round **up** to a whole number) x	_____	= _____

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other (e.g., late filing surcharge): **Appeal Brief**	500.00

SUBMITTED BY

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Signature				Date	3/29/06